

Table 21. Site Summary and Significance Evaluations

SHPO Site (50-10-31-)	Site Type	Function	Possible Age	Recommended Significance	PTA Study Area
19490	Complex of features	Repeated-use occupation; transportation	*AD 1480 to 1950	D	BAX
21308	Lava tube	Limited-use occupation	Pre-Contact	D	BAX
23455	Excavated pits	Possible bird catchments	Pre-Contact	D	BAX
23456	Enclosure	Limited-use occupation	Pre-Contact	D	BAX
23457	Trail-mound complex	Transportation	Pre-Contact	D	BAX
23458	Modified lava flow	Volcanic glass quarries	Pre-Contact	D	BAX
23462	Mounds	Possible transportation	Pre-Contact	D	BAX
23621	Excavated pits	Possible bird catchments	Pre-Contact	D	BAX
23626	Lava tube	Repeated-use occupation	*AD 1640-1950	D	BAX
18673	Lava tube	Repeated-use occupation	*AD 1280-1680	D	AALFTR
21285	Lava tube	Limited-use occupation	*AD 1170-1300	D	AALFTR
21299	Lava tube	Limited-use occupation	*AD 1520-1950	D	AALFTR
23463	Excavated pits	Possible bird catchments	Pre-Contact	D	AALFTR
23464	Lava tube	Limited-use occupation	Pre-Contact	D	AALFTR
23465	Lithic scatter; modified boulders	Lithic workshop; quarry	Pre-Contact	D	AALFTR
23622	Excavated pits	Possible bird catchments	Pre-Contact	D	AALFTR
23625	Lava tube	Limited-use occupation	Pre-Contact	D	AALFTR
18671	Lava tube	Repeated-use occupation	*AD 1478-1955	D	AALFTR ext.
21667	Modified lava flow	Volcanic glass quarries	Pre-Contact	D	AALFTR ext.
21669	Modified lava flow	Volcanic glass quarries	Pre-Contact	D	AALFTR ext.
21670	Modified lava flow	Volcanic glass quarries	Pre-Contact	D	AALFTR ext.
21671	Modified lava flow	Volcanic glass quarries	Pre-Contact	D	AALFTR ext.
23466	Terrace	Transportation	Pre/post-Contact	D	AALFTR ext
23470	Mound	Possible marker	Pre/post-Contact	D	AALFTR ext

* represents span of multiple date ranges

Repeated Occupation

Repeated-use occupations are defined by the presence of stratified deposits, a wide range of artifacts, and/or associated structures, including multiple hearths and structural components (Streck 1992:102). Four lava tube-blister sites (Sites 18671, 18673, 19490, and 23626) in the project area meet these criteria. All four sites contain a relatively dense cultural deposit (dominated by bird bone), a wide range of artifacts and structural features inside or outside the lava tube or blisters features that define separate activity areas, such as sleeping areas, lithic reduction, hearths and possible ceremonial components.

Site 19490 (Feature C) comprises a well-stratified hearth clearly indicating repeated use of the cave and hearth locale during an extended period of the pre-Contact era, beginning ca. AD 1480. The cultural deposit confirms a variety of activities were conducted at Feature C, such as preparation and cooking of birds – primarily *ua'u* or Hawaiian Petrel – and reduction of basalt and volcanic glass, the latter material likely extracted from glassy surfaces of the k4 lava flow (e.g., Site 23458 roughly 2,000 m to the south). The presence of gourds also suggests water was being collected from driplines inside the caves.

Site 18673 is comparable to Site 19490 in size, cultural content, and multiple features, including two hearths, a ceremonial component and other well-defined activity areas. Shapiro *et al.* (1998:65) note the lava tube interior provided enough space to accommodate groups of people, such as families or teams of bird hunters or adze manufacturers. Three samples collected from the site produced date ranges spanning between AD 1280 and 1680; two of the date ranges from intact hearths yielded the earlier date ranges spanning between AD 1280 and 1530.

Sites 18671 and 23626 are comparable in their small interiors, narrow entrances and more limited artifact distributions, suggesting the repeated occupations were less frequent. Site 18671 contains at least two separate hearths and multiple activity areas defined by artifact or charcoal concentrations, or mixture of both. Two of the charcoal concentrations in separate areas of the site produced date ranges attributable to the middle to late pre-Contact. A single hearth at Site 23626 was deeply stratified and also attributable to the late pre-Contact era, beginning ca. AD 1640.

Limited Occupation

Limited occupations at PTA are defined as short-term in duration, sometimes as brief as an overnight stay (Streck 1992:102). The sites are often limited to charcoal scatters or shallow ash deposits and contain few artifacts and scant midden – if present. Six sites in the project area fit this definition, including five lava tubes or blisters (Sites 21285, 21299, 21308 and 23464) and an isolated surface enclosure (Site 23456).

Habitation structures, such as Site 23456 (enclosure), are infrequent at PTA, probably because more suitable shelters exist in blisters and tubes formed in the lava flows. The site has a limited-use function based on its small interior (less than 5 m²) and scarce surface deposit limited to four hammerstones, possibly used previously as bird cooking stones, or both functions. The artifacts may indicate the occupants were involved with extraction activities at the nearby volcanic glass quarries or Mauna Kea quarries. A bird cooking stone or, *pōhaku eho*, is also considered to be a sacred object used in ceremony while ascending and descending Mauna Kea (cf. McCoy 1991:173-178).

The remaining five sites occur in lava tubes and blisters commonly with small interiors or more spacious caverns that lack natural light. One exception is Site 23625, which contains multiple caverns and tubes with sizable living areas. Surprisingly, only one surface artifact was identified

on the surface of Site 23625 and no cultural material was recovered from a test unit excavated next to the surface artifact.

Single hearths were recorded at three of the sites (Sites 21285, 21299, and 23464), all of which were characterized by shallow deposits exceeding not more than 4 cm thick. The hearth at Site 21285 lacked cultural materials and produced the earliest occupation dates in the project area, ranging between AD 1170 and 1300. The hearth at Site 21299 yielded only bird bone consisting primarily of *ua'u* and was dated to the late pre-Contact era, beginning *ca.* AD 1520.

8.2.2 Resource Procurement

Three types of resource procurement sites have been identified in the project area, including an isolated basalt quarry, and extensive landscape modifications for the extraction of volcanic glass quarries and possibly capture of *ua'u* (Hawaiian Petrel) from existing or modified nesting areas.

Basalt Quarry

A basalt quarry (Site 23465) was recorded along the western edge of a massive *a'a* flow (k4), derived from Mauna Loa. The site represents the only basalt quarry identified in the project area and is similar to another basalt quarry (Site 18675) in a Mauna Loa lava flow south of the project area (Shapiro *et al.* 1998:68). The fine-grained basalt occurs in large boulders at the outer or eastern base of the k4 flow, formed around 330 years BP. The material appears to have been extracted in large blocks from the boulders and re-worked into smaller cores (roughly 10 to 20 cm in diameter) at or near the extraction point. Further reduction of the cores is suggested by the presence of basalt flakes and hammerstones on the older lava flow (k10 flow) adjacent to the quarry. This reduction area also contains an adze preform, the source of which is undetermined, and volcanic glass cores possibly extracted from other k4 quarries identified north of the site area.

Volcanic Glass Quarries

Over 35 individual volcanic glass quarries were recorded in the central portion of the project area on glassy crusts of *pāhoehoe* lava associated with the k4 flow. The individual quarry features in the project area were grouped into five sites (Sites 21667, 21669, 21670, 21671, and 23458) depending on spatial associations (Site 23458) and proximity to four previously identified sites (Sites 21667, 21669, 21670 and 216710) east of Redleg Trail (Roberts *et al.* 2000a; 2000b and Williams 2002).

The volcanic glass quarries recorded to date in eastern PTA span over roughly 42 acres of the k4 flow and include at least 525 individual quarries or extraction areas (Roberts 2004b). These quarry features as a complex represent a unique cultural resource in the Hawaiian Islands that, based on the multitude of quarries and amount of material potentially extracted, likely exceeded local needs (e.g., bird hunters) and was probably intended for trade or distribution beyond the Saddle Region (cf. Williams 2002:72). The most recent date for the k4 flow is 330 years BP (Sinton 2004), which correlates with the late pre-Contact era around AD 1650.

As described by Sinton (2003), the glass exposures are dense *pāhoehoe* lava that formed in underground lava tubes and subsequently oozed upward to the current surface. The quarries are commonly present on all glassy exposures in the k4 flow, particularly along the base of tumuli, vertical faces of uplifted lava and on lobes formed by ropey lava. Although no quarry tools were observed inside the project area, hammerstones were identified adjacent to quarries by both Williams (2002) and Roberts (2004b) east of Redleg Trail. Williams (2002:71) proposes that extraction of volcanic glass involved using large hammerstones of vesicular basalt to break the

material free and smaller, dense basalt hammerstones for secondary reduction of the material to cores.

The raw material observed in cultural deposits of PTA occupation sites (e.g., Site 19490) is commonly blocky in form following what appear to be natural break lines in the lava rock. Volcanic glass shatter and debitage is abundant at both the quarries and cultural deposits at occupation sites at PTA. Blade-like flakes are also common at both venues and likely represented removal of ropey surfaces of the flow.

Bird Hunting

Four sites (Sites 23455, 23463, 23621 and 23622) in the project area consist of over 340 pits excavated in *pāhoehoe* flows associated with the k2 and k10 flows. Excavated pits characteristic of these project sites were also identified in great numbers east of the project area (Roberts *et al.* 2004b; Williams 2002; Williams *et al.* 2002). Within the k2 and k10 flows, the pits appear to be most concentrated in proximity to single or groupings of habitation sites (see Figure 108). The pits are excavated through the surface mantle of the *pāhoehoe* flow (roughly 5-10 cm thick) and usually occur on the edge or top of an underground pocket or blister in the flow.

In concurrence with thorough research done by Hu *et al.* (2001) at Volcano National Park, and Moniz-Nakamura (1998) at PTA, the pit features are tentatively classified as bird hunting pits created by pre-Contact Hawaiians to expand the nesting areas of *ua'u* (Hawaiian Petrel) and to access otherwise unreachable birds nests in narrow caverns in the *pāhoehoe*. Although no empirical data has been collected from the pits to confirm this interpretation, archival, ethnographic and archaeological data certainly attest that during the nesting period *ua'u* were hunted, prepared and eaten in abundance in the Saddle region.

If the excavated pits reflect bird hunting activities, then the number of pits present in the project area and elsewhere at PTA suggest that Hawaiians attempted or succeeded in the capture of a large number of birds. An abundance of local subsistence goods – limited to bird meat in the region – may have been required to support intensive quarry activities at the Mauna Kea Adze Complex (cf. Williams 2002:15, among others) and at the nearby volcanic glass quarries currently recorded inside PTA.

8.2.3 Transportation

Three sites in the project area (Sites Feature 19490, Features F and K, 23457, and 23466) are trails and two sites may represent markers of unmarked trails (Sites 23462 and 23470).

Sites 19490 and 23457 are marked by linear pathways, including trodden *a'a* surfaces and stepping stones characteristic of a traditional Hawaiian foot trail (Sites 19490 and 23457). Both sites are oriented northeast-southwest in the northern portion of the project area (see Figure 10) and may represent sections of a longer trail once extending across the Saddle east to west. Another trail section (Feature K) extending south of Site 19490's Feature F trail, may be a secondary travel route that provided access to local resources in the south, such as volcanic glass quarries and possible bird pits (e.g., Sites 23458 and 23626).

Site 23466 is located on the north side of Pu'u Kulua, just west of Redleg Trail. The site is retained by retained curbing on one side, which may be characteristic of a historically modified trail for horse travel or just a well-defined traditional trail. Site 23470 is a solitary mound possibly marking a continuation of Site 23466 on the southwest side of the *pu'u*.

9.0 SIGNIFICANCE EVALUATIONS AND RECOMMENDATIONS

9.1 SIGNIFICANCE EVALUATIONS

An historic site or property is considered eligible for the National Register of Historic Places (NRHP), if it meets criteria for evaluation defined in 36 CFR 60.4 as the follows:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association and:

- (a) **The site is associated with events** that have made a significant contribution to the broad patterns of our history; or
- (b) **that are associated with the lives of persons** significant in our past; or
- (c) **that embody the distinctive characteristics** of a type period, or method of construction, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- (d) **that has yielded, or may be likely to yield, information** important in prehistory or history.

All 24 sites in the BAX, AALFTR and AALFTR Extension are evaluated as significant and considered eligible for the NRHP (see Table 21).

9.1.2 Significance Criterion D

All 24 sites in the project area are evaluated as eligible under Significance Criteria D, as having yielded or likely to yield information important to the prehistory or history of the region.

The resource procurement sites (Sites 21667, 21669, 21670, 21671, 23455, 23458, 23463, 23465, 23621, and 23622) have yielded important information regarding the locations, methods of procurement, and magnitude of exploitation of two significant resources (bird meat and high-quality stone) abundant in the Saddle Region. Additional data may be obtained from the quarry sites through methodical sourcing of the extraction points and sourcing of artifacts obtained outside the Saddle Region to indicate routes of trade and distribution. The intact debitage and raw material of the quarry sites have integrity to yield the significant geological data. Although no additional data is obtainable from the individual pits possibly used to catch birds, the sites – as a landscape – may contribute information regarding the density and locations of traditional bird hunting in the Saddle. These complexes have integrity through intactness of the pits themselves.

The occupation sites (Sites 18671, 18673, 21285, 21299, 23464, 23625, 19490, 21308, 23456, and 23626) contribute valuable data regarding periods of pre-Contact occupation, activities associated with the occupation and resource procurement, and possible ceremonial activities in the Saddle Region. The integrity of these sites is expressed in the data obtainable in the form of intact surface or subsurface deposits that might indicate additional periods of occupation and associated activities not yet identified at the site.

The trails and possible trail markers (e.g., cairns) (Sites 23457, 23462, 23466, and 23470) provide valuable data contributing to a better understanding of locations of important resources and movement through the Saddle Region. Their integrity is expressed through the intact architecture and well-defined trodden surfaces of the trails and markers.

9.2 RECOMMENDATIONS

In accordance with the Programmatic Agreement (PA) developed for all SBCT-related projects (U.S. Army 2004), all 24 sites and component features evaluated as eligible for the NRHP should be avoided during all construction or ground-disturbing activities. In the event that project sites might be adversely affected by an undertaking, appropriate consultation and mitigation measures must be implemented in accordance with the PA and all other Federal guidelines directing management of cultural resources.

In ensure that all sites will be appropriately avoided and protected during future construction projects, it is recommended that a short-term protection plan be developed, which will include proposed buffer zones for each site and types of barriers intended to protect the sites. This plan should be developed prior to or in conjunction with planning phases of proposed construction work. As planned, archaeological and cultural monitors will be involved in the re-identification and protection of sites during construction activities.